

We claim:

1. A method for the determination of the location of a mobile station (MS) equipped with embedded GPS signal reception capability and equipped to operate within a wireless communications network, the method comprising:

(a) receiving GPS data at a land station, said GPS data being received from a MS to be located;

(b) at a land station equipped with location-measurement facilities, receiving a communications-band signal from said MS to be located and using the location-measurement facilities to extract location-related characteristic data from the communications-band signal; and

(c) at a land station equipped for location-determination calculations, performing location-determination calculations using the GPS data and the extracted location-related characteristic data to derive an estimated location for the MS.

2. A method as recited in claim 1, further comprising providing assistance data to the MS to be located, said assistance data enabling the MS to receive GPS coarse/acquisition (C/A) signals and extract TOA or pseudorange measures, wherein said TOA or pseudorange measures are then communicated to the said land station equipped with location-measurement facilities.

3. A method as recited in claim 1, further comprising communicating the GPS data and the extracted location-related characteristic data to said land station equipped for location-determination calculations.

4. A method as recited in claim 1, wherein said location-related characteristic data extracted from the communications-band signal includes time of arrival (TOA) data.

5. A method as recited in claim 1, wherein said location-related characteristic data extracted from the communications-band signal includes time difference of arrival (TDOA) data.

6. A method as recited in claim 1, wherein said location-related characteristic data extracted from the communications-band signal includes angle of arrival (AOA) data.

7. A method as recited in claim 1, wherein said location-related characteristic data extracted from the communications-band signal includes data concerning signal strength or propagation loss (PL).

8. A method as recited in claim 1, wherein said location-related characteristic data extracted from the communications-band signal includes timing advance (TA) data.

9. A method as recited in claim 1, further comprising using collateral information in performing said location-determination calculations.

10. A method as recited in claim 1, wherein said method is employed to achieve applicable Federal Communications Commission (FCC) accuracy requirements for E-911.

11. A system for the determination of the location of a mobile station (MS) equipped with embedded GPS signal reception capability and equipped to operate within a wireless communications network, comprising:

(a) means for providing assistance data to the MS to be located, said assistance data enabling the MS to receive GPS coarse/acquisition (C/A) signals and extract TOA or pseudorange measures;

(b) means for receiving GPS data for use in location-determination calculations, said GPS data being received from a MS to be located;

(c) a land station equipped with location-measurement facilities and a receiver for receiving from said MS to be located wireless a communications-band signal and using the location-measurement facilities to extract location-related characteristic data from the communications-band signal; and

(d) a land station equipped for location-determination calculations, including a processor for performing location-determination calculations using the GPS data and the extracted location-related characteristic data to derive an estimated location for the MS.

12. A system as recited in claim 11, further comprising means for communicating the GPS data and the extracted location-related characteristic data to said land station equipped for location-determination calculations.

13. A system as recited in claim 11, wherein said location-related characteristic data extracted from the communications-band signal includes time of arrival (TOA) data.

14. A system as recited in claim 11, wherein said location-related characteristic data extracted from the communications-band signal includes time difference of arrival (TDOA) data.

15. A system as recited in claim 11, wherein said location-related characteristic data extracted from the communications-band signal includes angle of arrival (AOA) data.

16. A system as recited in claim 11, wherein said location-related characteristic data extracted from the communications-band signal includes data concerning signal strength or propagation loss (PL).

17. A system as recited in claim 11, wherein said location-related characteristic data extracted from the communications-band signal includes timing advance (TA) data.

18. A system as recited in claim 11, further comprising using collateral information in performing said location-determination calculations.

19. A system as recited in claim 11, wherein said system achieves applicable Federal Communications Commission (FCC) accuracy requirements for E-911.